

CLAIMS

1. An implantable device comprising:

a stepper motor;

5 a moveable member, moveable by the stepper motor; and  
an oscillator,

wherein the oscillator is influenced by a signal derived from or supplied to  
the stepper motor to enable information on the moveable member to be feedback to an  
external controller by passive telemetry.

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2. A device according to claim 1, wherein said signal is the electrical signal  
applied to one coil of the stepper motor.

15 3. A device according to claim 1, wherein said signal is the voltage induced in a  
secondary coil wrapped around a coil of the stepper motor.

4. A device according to claim 1, 2 or 3, wherein the oscillator drives an  
absorption modulator for use in feedback of said information by passive telemetry  
using FM-AM modulation.

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5. A device according to any one of the preceding claims, wherein said signal  
modifies the frequency of the oscillator.

25 6. A device according to claim 5, wherein said signal is used to modify one of:  
at least one parameter of a resistor-capacitor network associated with the oscillator;  
and at least one parameter of a crystal oscillator comprising the oscillator.

30 7. A device according to any one of the preceding claims, further comprising a  
microcontroller for driving the stepper motor, wherein the oscillator also comprises  
the external oscillator for providing a clock signal to the microcontroller.

8. A device according to any one of the preceding claims, wherein a reference position of the moveable member is detected by a detector which is used to influence the oscillator.

5 9. A device according to claim 8, wherein said detector causes a shift in frequency of said oscillator when the reference position is detected.

10. A device according to claim 8 or 9, wherein the detector is selected from the group consisting of: an electrical contact switch, a Hall-effect switch, a force-sensing resistor, a variable inductor, and a piezoresistive element.

10 11. A device according to any one of the preceding claims, encapsulated into a biocompatible, non-metallic package.

15 12. A system comprising: an implantable device according to any one of the preceding claims; and an external controller comprising means for counting pulses in said signal feedback by passive telemetry for determining the motion of the stepper motor and the position of the moveable member.

20 13. A system according to claim 12, wherein said external controller further comprises means for analysing the shape of said signal to detect blockage of the stepper motor.

25 14. A device according to any one of claims 1 to 11 or a system according to claim 12 or 13, further comprising one selected from the group consisting of:  
a flow controller adjustable by said moveable member for blood flow regulation on native vessels or artificial grafts;  
gastric banding adjustable by said moveable member for treatment of obesity;  
oesophageal banding adjustable by said moveable member for treatment of  
30 Gastro Enteral Reflux Disease;  
an artificial sphincter adjustable by said moveable member for treatment of urinary incontinence;

an artificial sphincter adjustable by said moveable member for treatment of faecal incontinence;

an artificial sphincter adjustable by said moveable member for use following a colostomy;

5 an artificial sphincter adjustable by said moveable member for use following an ileostomy; and

a drug infusion system adjustable by said moveable member.

15. 15. Use of a device or system according to any one of the preceding claims in the manufacture of a medical device for use in at least one selected from the group of:

10 blood flow regulation on native vessels or artificial grafts;  
gastric banding for treatment of obesity;  
oesophageal banding for treatment of Gastro Enteral Reflux Disease;  
control of an artificial sphincter for treatment of urinary incontinence;  
15 control of an artificial sphincter for treatment of faecal incontinence;  
control of an artificial sphincter following a colostomy;  
control of an artificial sphincter following an ileostomy; and  
control of a drug infusion system.

20 16. Use of a device or a system according to any one of claims 1 to 14 in an application selected from the group consisting of:

25 blood flow regulation on native vessels or artificial grafts;  
gastric banding for treatment of obesity;  
oesophageal banding for treatment of Gastro Enteral Reflux Disease;  
control of an artificial sphincter for treatment of urinary incontinence;  
control of an artificial sphincter for treatment of faecal incontinence;  
control of an artificial sphincter following a colostomy;  
control of an artificial sphincter following an ileostomy; and  
control of a drug infusion system.